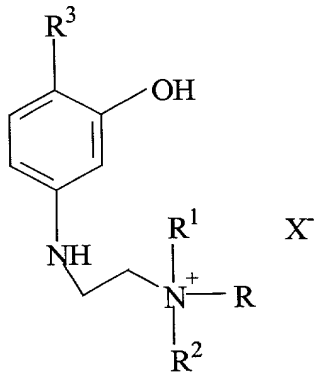
We Claim:

1. A compound of formula (1):



(1)

wherein X is selected from the group consisting of halogen: R^3 is selected from the group consisting of C_1 to C_2 alkyl and hydroxyethyl; and R, R^1 and R^2 are each independently selected from the group consisting of C_1 to C_{22} alkyl or C_1 to C_{22} mono or dialkyl groups, or two of R, R^1 and R^2 together with the the nitrogen atom to which they are attached form a C_3 to C_6 cycloaliphatic or a C_3 to C_{14} aromatic group, the cycloaliphatic or aromatic group optionally containing in their rings one or more hetero atoms selected from O, S and N atoms

2. A compound of Claim 1 wherein X is selected from the group consisting of Cl, Br, and I; and two of R, R^1 and R^2 together with the nitrogen atom to which they are attached form an C_3 to C_6 cycloaliphatic or C_3 to C_6 aromatic group optionally containing in the ring another N atom.

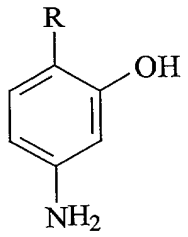
3. A compound of Claim 2 wherein X is Cl.

4. A compound of Claim 3 wherein R^3 is methyl.

5. A compound of Claim 4 wherein two of R, R^1 and R^2 together with the nitrogen atom to which they are attached form an imidazoline ring.

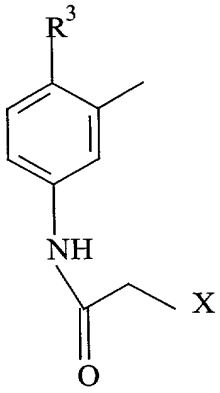
6. A compound of Claim 4 wherein two of R, R1 and R2 together with the nitrogen atom to which they are attached form a piperazine ring.

7. A process for the preparation of a compound of Claim 1 comprising reacting an aminophenol of the formula (2):



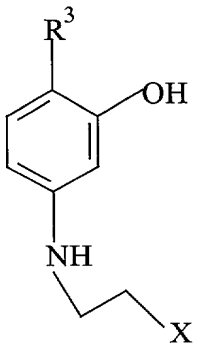
(2)

with a haloacetyl chloride to produce a compound of formula (5)

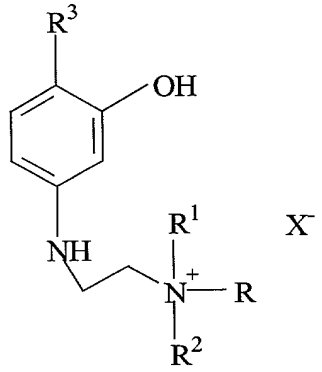


(5)

reducing compound (5) with a borane-tetrahydrofuran complex to produce a compound of formula (6)



and reacting the compound of formula (6) with a reagent of the formula $N(R^1)(R^2)(R^3)$to produce a compound of formula (1)



(1)

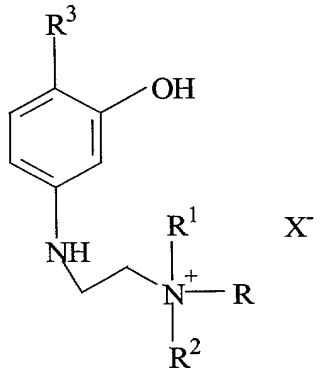
wherein X, R, R^1, R^2 and R^3 are as defined in Claim 1.

8. A process according to Claim 7 wherein X is selected from the group consisting of Cl, Br, and I; and two of R, R^1 and R^2 together with the nitrogen atom to which they are attached form an C_3 to C_6 cycloaliphatic or C_3 to C_6 aromatic group optionally containing in the ring another N atom.

9. A process according to Claim 8 wherein X is Cl; R^3 is methyl; and the other of R, R^1 and R_2 not forming the cycloaliphatic or aromatic group is methyl.

10. A process according to Claim 7 wherein the reducing agent is selected from the group consisting of sodium borohydride and sodium triacetoxyborohydride.

11. In a hair coloring system comprising a composition containing one or more oxidative hair coloring agents and a composition containing one or more oxidizing agents, the improvement comprising the presence in the composition containing one or more oxidative hair coloring agents of a coupler comprising a compound of formula (1):



(1)

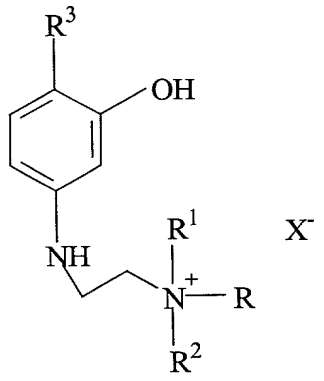
wherein X is selected from the group consisting of halogen; R^3 is selected from the group consisting of C_1 to C_2 alkyl and hydroxyethyl; and R, R^1 and R^2 are each independently selected from the group consisting of C_1 to C_{22} alkyl or C_1 to C_{22} mono or dialkyl groups, or two of R, R^1 and R^2 together form a C_3 to C_6 cycloaliphatic or a C_3 to C_{14} aromatic group, the cycloaliphatic or aromatic group optionally containing in their rings one or more hetero atoms selected from O, S and N atoms.

optionally containing in their rings one or more hetero atoms selected from O, S and N atoms.

12. A hair coloring system according to Claim 11 wherein the composition comprising one or more oxidative hair coloring agents additionally comprises one or more primary intermediates selected from the group consisting of: 2-methyl-benzene-1,4-diamine, benzene-1,4-diamine, 2-(2,5-diamino-phenyl)-ethanol, 1-(2,5-diamino-phenyl)-ethanol, 2-[(4-amino-phenyl)-(2-hydroxy-ethyl)-amino]-ethanol, 4-amino-phenol, 4-methylamino-phenol, 4-amino-3-methyl-phenol, 1-(5-amino-2-hydroxy-phenyl)-ethane-1,2-diol, 2-amino-phenol, 2-amino-5-methyl-phenol, 2-amino-6-methyl-phenol, N-(4-amino-3-hydroxy-phenyl)-acetamide, pyrimidine-2,4,5,6-tetramine, 2-(4,5-diamino-1H-pyrazol-1-yl)ethanol, 1-(4-methylbenzyl)-1H-pyrazole-4,5-diamine, and 1-(benzyl)-1H-pyrazole-4,5-diamine.

13. A hair coloring system according to Claim 12 wherein X is selected from the group consisting of Cl, Br, and I; and two of R, R^1 and R^2 together with the nitrogen atom to which they are attached form an C_3 to C_6 cycloaliphatic or C_3 to C_6 aromatic group optionally containing in the ring another N atom.

14. In a system for coloring hair wherein at least one primary intermediate is reacted with at least one coupler in the presence of an oxidizing agent to produce an oxidative hair dye, the improvement wherein the at least one coupler comprises a compound of the formula (1):



(1)

wherein X is selected from the group consisting of halogen; R^3 is selected from the group consisting of C_1 to C_2 alkyl and hydroxyethyl; and R, R^1 and R^2 are each independently selected from the group consisting of C_1 to C_{22} alkyl or C_1 to C_{22} mono or dialkyl groups ,or two of R, R^1 and R^2 together form a C_3 to C_6 cycloaliphatic or a C_3 to C_{14} aromatic group, the cycloaliphatic or aromatic group optionally containing in their rings one or more hetero atoms selected from O, S and N atoms.

15. A system for coloring hair according to Claim 14 wherein the system additionally comprises one or more primary intermediates selected from the group consisting of: 2-methyl-benzene-1,4-diamine, benzene-1,4-diamine, 2-(2,5-diamino-phenyl)-ethanol, 1-(2,5-diamino-phenyl)-ethanol, 2-[(4-amino-phenyl)-(2-hydroxy-ethyl)-amino]-ethanol, 4-amino-phenol, 4-methylamino-phenol, 4-amino-3-methyl-phenol, 1-(5-amino-2-hydroxy-phenyl)-ethane-1,2-diol, 2-amino-phenol, 2-amino-5-methyl-phenol, 2-amino-6-methyl-phenol, N-(4-amino-3-hydroxy-phenyl)-acetamide, pyrimidine-2,4,5,6-tetramine, 2-(4,5-diamino-1H-pyrazol-1-yl)ethanol, 1-(4-methylbenzyl)-1H-pyrazole-4,5-diamine, and 1-(benzyl)-1H-pyrazole-4,5-diamine.

16. A system for coloring hair according to Claim 14 wherein the system contains one or more couplers selected from the group consisting of:

benzene-1,3-diol, 4-chlorobenzene-1,3-diol, naphthalen-1-ol, 2-methyl-naphthalen-1-ol, 2-methyl-benzene-1,3-diol, 2-(2,4-diamino-phenoxy)-ethanol, 2-(3-amino-4-methoxy-phenylamino)-ethanol, 2-[2,4-diamino-5-(2-hydroxy-ethoxy)-phenoxy]-ethanol, and 3-(2,4-diamino-phenoxy)-propan-1-ol, 3-amino-phenol, 5-amino-2-methyl-phenol, 5-(2-hydroxy-ethylamino)-2-methyl-phenol, 3-amino-2-methyl-phenol, 3,4-dihydro-2H-1,4-benzoxazin-6-ol, 4-methyl-2-phenyl-2,4-dihydro-3H-pyrazol-3-one, 1H-indol-6-ol, and 2-aminopyridin-3-ol.

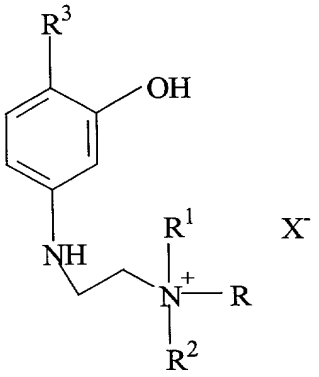
17. A system for coloring hair according to Claim 15 wherein the system contains one or more couplers selected from the group consisting of: benzene-1,3-diol, 4-chlorobenzene-1,3-diol, naphthalen-1-ol, 2-methyl-naphthalen-1-ol, 2-methyl-benzene-1,3-diol, 2-(2,4-diamino-phenoxy)-ethanol, 2-(3-amino-4-methoxy-phenylamino)-ethanol, 2-[2,4-diamino-5-(2-hydroxy-ethoxy)-phenoxy]-ethanol, and 3-(2,4-diamino-phenoxy)-propan-1-ol, 3-amino-phenol, 5-amino-2-methyl-phenol, 5-(2-hydroxy-ethylamino)-2-methyl-phenol, 3-amino-2-methyl-phenol, 3,4-dihydro-2H-1,4-benzoxazin-6-ol, 4-methyl-2-phenyl-2,4-dihydro-3H-pyrazol-3-one, 1H-indol-6-ol, and 2-aminopyridin-3-ol.

18. A system for coloring hair according to Claim 15 wherein X is selected from the group consisting of Cl, Br, and I; and two of R, R^1 and R^2 together with the nitrogen atom to which they are attached form an C_3 to C_6 cycloaliphatic or C_3 to C_6 aromatic group optionally containing in the ring another N atom.

19. A hair coloring composition for dyeing human hair comprising, in a suitable carrier or vehicle, a dyeing effective amount of:

(a) at least one primary intermediate,

(b) at least one coupler comprising a compound of the formula (1):



(1)

wherein X is selected from the group consisting of halogen; R^3 is selected from the group consisting of C_1 to C_2 alkyl and hydroxyethyl; and R, R^1 and R^2 are each independently selected from the group consisting of C_1 to C_{22} alkyl or C_1 to C_{22} mono or dialkyl groups ,or two of R, R^1 and R^2 together form a C_3 to C_6 cycloaliphatic or a C_3 to C_{14} aromatic group, the cycloaliphatic or aromatic group optionally containing in their rings one or more hetero atoms selected from O, S and N atoms; and

(c) at least one oxidizing agent.

20. A hair coloring composition of Claim 19 wherein X is selected from the group consisting of Cl, Br, and I; and two of R, R^1 and R^2 together with the nitrogen atom to which they are attached form an C_3 to C_6 cycloaliphatic or C_3 to C_6 aromatic group optionally containing in the ring another N atom.

21. A process for dyeing human hair comprising applying a dyeing effective amount of a hair coloring composition of Claim 19 to the hair and permitting the composition to contact the hair for a dyeing effective period of time, and then rinsing, shampooing and drying the hair.

22. A process according to Claim 21 wherein X is selected from the group consisting of Cl, Br, and I; and two of R, R^1 and R^2 together with the nitrogen atom to which they are attached form an C_3 to C_6 cycloaliphatic or C_3 to C_6 aromatic group optionally containing in the ring another N atom.

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